

FINANCIAL CALCULATIONS

Excel includes a large number of financial functions—50 in all—covering everything from simple household budget problems, such as calculating a house payment, to complex tasks such as figuring the bond-equivalent yield for a U.S. Treasury bill (TBILLEQ) or the yield of a security that has an odd last period (ODDLYIELD).

Most of the more advanced financial functions, including those that calculate depreciation schedules (DB, DDB, SLN, SYD, and VDB) and internal rates of return (IRR, MIRR), are useful only if you have enough of an accounting or finance background to understand the underlying principles. However, a number of general-purpose functions are useful for a wide variety of calculations involving loans and investments. You can calculate the periodic payment for a loan or annuity using PMT, figure the net present value of an investment or loan with NPV, determine the interest and principal portion of a periodic payment with IPMT and PPMT, and calculate the future value of an investment (FV). These functions, and several more that cover the same ground, use some or all of the following common arguments:

- Future value (fv) is the amount that an investment or loan will be worth after all payments have been made. When dealing with investments, fv is usually positive; in the case of loans, fv is typically 0.
- Number of periods (nper) is the total number of payments or periods of an investment. Make sure the unit of measurement is consistent with the payment period; if you pay a 30-year mortgage monthly, nper is equal to 360 (30*12).
- Payment (pmt) is the amount paid periodically to an investment or loan. It cannot change over the life of the annuity. Typically, pmt includes principal and interest but no other fees or taxes. For a loan or investment, in which you are the one making payments, you typically enter pmt as a negative number; if you receive dividends or other payments (in other words, if you're the bank), pmt is generally a positive number.
- Present value (pv) is the value of an investment or loan at the beginning of the investment period. When you are the borrower, the present value of a loan is the principal amount that is borrowed, expressed as a negative number.
- Rate (rate) is the interest rate or discount rate for a loan or investment. Pay particular attention that nper and rate use the same scale as pmt. If you make monthly payments on a 30-year loan at 7.5% annual interest, use 7.5%/12 for rate (to convert the annual rate to a monthly rate, such as the payments) and 30*12 for nper (360, the number of monthly payments in a 30-year loan).
- Type (type) is the interval at which payments are made during the payment period, such as at the beginning of a month or the end of the month. In interest rate calculations over a long period of time, the difference can be substantial.

LOGICAL TESTS

Excel includes six *comparison functions*, which you can use to compare two values and define actions based on the comparison. Far and away the most popular and useful logical function is IF. The following is the syntax of the IF function:

`=IF(logical_test,value_if_true,value_if_false)`

Excel also includes 18 *information functions*, which give you information about cells, worksheets, and your system itself. For the most part, you'll use these functions to build error-handling and data-validation routines into a worksheet. Nine of these functions belong in a subgroup called the IS functions: ISTE^{XT}, ISERR^{OR}, ISNUM^{BER}, and so on.

By combining the IF function and the ISERR^{OR} function, you can avoid seeing error codes in a worksheet. The formula `=IF(ISERROR(A5/A8),"",A5/A8)`, for example, tests the value of the formula A5/A8 before displaying a result. If A8 is equal to 0, Excel displays nothing in the cell rather than the annoying #DIV/0! error message; if the value of A8 is other than 0 and the formula returns a valid result rather than an error message, Excel displays that result.

TIP FROM

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In many cases, *conditional formatting* is a better way to suppress error messages than using formulas. Select the cell in which you want to suppress error messages—A9, for instance—then click the Conditional Formatting button on your Home ribbon. Select Highlight Cell Rules and choose Equal To. In the edit box at the left, enter the formula `=ISERROR(A9)`. Next, click the Format button, select Custom Format, and in the Format Cells dialog box choose the white square. Click OK to close the Format Cells dialog box and click OK to close the Condition Formatting dialog box. Now any error messages in that cell will appear as white text on a white background and will be invisible.

→ For a detailed discussion of conditional formatting, see "Using Conditional Formatting to Identify Key Values," p. 583.

TEXT MANIPULATION FUNCTIONS

It's easy to think of functions in mathematical terms, but some of the most useful functions work strictly with text. You can use text functions to pull specific information from a single *text value*, split a text value into multiple cells, combine text values into a single string, or convert one type of data (such as a number or date) into text, using a specific format.

When you want to combine (or *concatenate*) the text from two cells, use an ampersand. The following formula adds a space between the values in two adjacent cells:

`=A1&" "&A2`

For more sophisticated manipulation of strings of text, use any of Excel's 27 text and data functions. These functions are especially useful when you've imported text from another program or file. Simple text functions let you convert text from all capitals to lowercase letters (and vice versa) or convert a date value to text in a specific format. The following formula, for example, combines three functions to pull out just the last name from a complete name in cell A17:

`=RIGHT(A17,LEN(A17)-FIND(" ",A17))`

The task isn't as easy as it might first appear. Because the last name can be any length (Bott or Leonhard, for example), you first need to calculate the correct number of characters. For starters, use the FIND function to locate the space separating the first and last names. If the